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**THE BOOK OF ABSTRACTS**

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# MECHANICAL PROPERTIES OF COMPOSITE MATERIAL REINFORCED WITH SILICA PARTICLES OBTAINED FROM BIOMASS MODIFIED WITH DOUBLE-LAYERED HYDROXIDES

Marija M. Vuksanović<sup>1</sup>, Adela Egelja<sup>1</sup>, Andrija Savić<sup>1</sup>, Milena Milošević<sup>2</sup>, Ivana Mladenović<sup>2</sup>, Aleksandar D. Marinković<sup>3</sup>, Radmila M. Jančić Heinemann<sup>3</sup>

<sup>1</sup>University of Belgrade, Institute of Nuclear Sciences "VINČA", Department of Chemical Dynamics and Permanent Education, Mike Petrovića Alasa 12-14, 11351 Belgrade, Serbia,  
[marija.vuksanovic@vin.bg.ac.rs](mailto:marija.vuksanovic@vin.bg.ac.rs)

<sup>2</sup>University of Belgrade, Institute of Chemistry, Technology and Metallurgy, National Institute of the Republic of Serbia, Department of Ecology and Techoeconomic, Njegoševa 12, 11000 Belgrade, Serbia

<sup>3</sup>University of Belgrade, Faculty of Technology and Metallurgy, Karnegijeva 4, 11120 Belgrade, Serbia

## ABSTRACT

Silica particles were produced from rice husk and used as reinforcement in the polymer matrix. The obtained silica particles' surfaces were modified with layered double hydroxides, which enabled better reinforcement in the PMMA matrix. Coprecipitation was used to synthesize Fe Al layered double hydroxides (LDH) with a Fe:Al cation content of 3:1 and an FeAl-LDH: silica ratio of 1:1. X-ray diffraction, Fourier transform infrared spectroscopy (FTIR), and scanning electron microscopy with EDS were used to characterize the synthesized particles. The prepared particle amounts in the PMMA matrix were 1, 3, and 5 wt. %. The purpose of this study was to see if the obtained SiO<sub>2</sub> particles, as well as their modification with FeAl-LDH, had any effect on the mechanical properties of polymer composite materials. The mechanical characterization of obtained composites was done using Vickers microindentation tests and impact testing. The Vickers micro-hardness test showed that the addition of reinforcement increases the hardness of the composite. When compared to the matrix, the toughness of the composite material with a higher content of particles (5 wt. %) in the energy absorbed in this impact test was three times higher.

**Keywords:** Silica, layered double hydroxides, composites, mechanical properties.